



Living and health conditions after a mining dam rupture: Brumadinho Health Project and Bruminha Project

Condições de vida e saúde após rompimento de barragem de mineração: Projeto Saúde Brumadinho e Projeto Bruminha

Sérgio Viana Peixoto^{I,II} , Carmen Ildes Rodrigues Fróes-Asmus^{III} 

^IFundação Oswaldo Cruz, René Rachou Institute – Belo Horizonte (MG), Brazil.

^{II}Universidade Federal de Minas Gerais, School of Nursing – Belo Horizonte (MG), Brazil.

^{III}Universidade Federal do Rio de Janeiro, School of Medicine – Rio de Janeiro (RJ), Brazil.

This supplement to the Brazilian Journal of Epidemiology addresses the topic of disasters in mining dams, especially the first results of the Brumadinho Integrated Health Actions Program (*Programa de Ações Integradas em Saúde de Brumadinho*). This program is an initiative of the Brazilian Ministry of Health, gathering two prospective population-based cohorts, the Brumadinho Health Project and the Bruminha Project¹, which receive funding from the Department of Science and Technology of the Secretariat of Science, Technology, Innovation and Strategic Inputs to Health (*Secretaria de Ciência, Tecnologia, Inovação e Insumos Estratégicos em Saúde* – DECIT/SCTIE) and the Oswaldo Cruz Foundation.

The projects are conducted in the municipality of Brumadinho, located in the Metropolitan Region of Belo Horizonte, in the state of Minas Gerais. In this municipality, on January 25, 2019, there was the rupture of the tailings dam at Córrego do Feijão Mine, under the responsibility of the mining company Vale S.A., affecting a considerable territorial area and causing about 270 deaths. The magnitude of this disaster shows the relevance of assessing the impacts

on the surrounding population such as the possible contamination of the environment and the effects on physical and mental health²⁻⁴.

The Brumadinho Health Project is conducted on a representative sample of residents in the municipality aged 12 years and over, including three estimation domains:

1. Residents in areas directly exposed to the dam rupture;
2. Residents in regions with mining activity;
3. Population not directly exposed to the tailings mud or mining activity.

Information from the cohort baseline (2021) was collected from the participants' households and included a detailed interview on health-related conditions and collection of biological material (blood and urine samples).

The Bruminha Project investigates the impact of the disaster on the health and development of children aged 0 to 6 years living in four locations in the municipality of Brumadinho:

1. Córrego do Feijão and Parque da Cachoeira, locations directly affected by the stream of ore tailings mud;

CORRESPONDING AUTHOR: Sérgio Viana Peixoto. Avenida Augusto de Lima, 1.715, Barro Preto, CEP: 30190-009, Belo Horizonte (MG), Brazil. E-mail: sergio.peixoto@fiocruz.br

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2. Tejuco, a location below a mining area and with population exposed to tailings dust; and
3. Aranha, a location far from the disaster zone and the mining areas, but with sociodemographic characteristics similar to those of the other areas.

Information was collected by the team of researchers from the project that evaluated children regarding the parameters related to weight-height growth, neuromotor, cognitive, and psychosocial developments, and complaints related to the respiratory system. The children were taken by their parents or guardians to the Health Center (*Unidade Básica de Saúde* — UBS) or the community center in each location where the team was situated and where urine samples were also collected for analysis of exposure to metal mine tailings.

The sharp increase in natural and technological disasters, with significant repercussions for the affected populations⁵, demonstrates the need to produce knowledge concerning these events, favoring risk management. Several studies have already demonstrated that the important health effects of disasters for populations⁶⁻⁸ may occur for a long period after the occurrence of the event⁹, but this knowledge is still incipient in Brazil.

The articles presented in this edition address topics relevant to the scenario of a major disaster, such as the one that occurred in Brumadinho, including mental health, respiratory diseases, nutritional aspects, use of health services and psychotropic drugs, working conditions, exposure to metals, child growth and development, among others.

This collection describes the results from the baseline of the cohorts, presented and discussed with the population, the Municipal and State Health Departments, and the Ministry of Health, favoring the planning of actions and aimed at mitigating the impacts caused by the rupture of the mining dam, strengthening the Brazilian Unified Health System (SUS) in the region. Monitoring the cohort will contribute to the advancement of knowledge of possible changes, in the medium- and long-term, in the living and health conditions of a population residing in an area affected by the dam rupture. In addition, this evidence may be considered in the risk management of these disasters, especially in municipalities in the state of Minas Gerais, where most of the country's mining dams are concentrated.

Finally, we draw attention to the importance of expanding knowledge production, such as in areas of environmental surveillance and healthcare models, which will contribute to a better understanding of the disaster, considering its complexity, allowing coordinated action by the various spheres of the SUS. The assessment of exposure to metal mine tailings in a representative sample of the entire population of the municipality showed the need to adapt the public health system to the specific

environmental conditions of the territory, including the characteristics of the production processes carried out there. Moreover, we observed the need for qualifying health professionals through continuing education programs and actions to monitor the population's exposure to tailings from these processes.

The consolidated set of information produced by the two studies in this collection of articles constitutes the first broad organization of knowledge of the impact of mining disasters in Brazil, with an approach that ranges from direct effects (on the health of individuals) to indirect ones (on the living conditions of the affected population). Thus, it represents an easily accessible source of consultation for managers, professionals, leaderships, representatives of society, among others.

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